

Appl. No. 09/275,097
Amdt. Dated Aug. 10, 2004-08-10
Reply to Office action of May 10, 2004

Amendments to the claims

The listing of claims will replace all prior versions, and listings, of claims in the application:

1. (previously presented) A method for the ordered release of switched connections from a network entity in a signaling communications network, the switched connections being routed across the communications network along respective connection paths established therefor between source and destination entities in response to a connection establishment request message propagated over a signaling link, the connection paths each traversing the network entity via network entity interfaces provided with the network entity through which said connections are routed, the method comprising the steps of:

(a) associating a priority indicator with each of the switched connections, the priority indicator being selected from a priority hierarchy comprised of a plurality of priority levels which varies from highest priority to lowest priority; and

(b) upon detection of failure, due to a network outage, of a signaling link or port which is associated with a number of switched connections, wherein a portion of said signaling link on one side of said network entity remains operational, propagating connection release messages from the network entity toward the source entity over said operational portion of said signaling link if said failure occurs on a destination side of said network entity, or toward the destination entity if said failure occurs on the source side of said network entity, for every switched connection of said number of switched connections which the failure of said signaling link or port has disrupted, and wherein said connection release messages are sent toward said source or destination entity in a sequence which corresponds to the priority hierarchy from the switched connection associated with the highest priority level to the connection associated with the lowest priority level.

2. (previously presented) The method according to Claim 1, wherein the step of releasing the connections comprises the steps of:

compiling, upon detection of said failure of said signaling link or part, an ordered release list comprising every connection of said number of switched connections;

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releasing the switched connections in the ordered release list in a sequence which corresponds to the priority hierarchy from the connections associated with the highest priority level to the connection associated with the lowest priority level.

3. (currently amended) The method according to Claim 2, wherein the compiling of the ordered release list comprises the steps of inserting each connection of said number of connections into a table in a location corresponding to the priority level associated with the connection such that the connections in the table are ordered in a sequence from the connection associated with the highest priority level to the connection associated with the highest priority level.

4. (currently amended) The method according to Claim 3, wherein the connection establishment request message includes a the priority indicator, an identification of a source of the corresponding connection, and an identification of a destination of the corresponding connection.

5. (currently amended) The method according to Claim 4, wherein the step of releasing the connections in said release list comprises the steps of:

transmitting a release message to the source of a connection in said release list if the network outage is detected between the network entity and the destination of the connection; and

transmitting a release message to the destination of a connection in said release list if the network outage is detected between the network entity and the source of the connection.

6. (original) The method according to Claim 5, wherein the priority indicators are associated with their respective connection in a look up table in a memory in the network entity.

7. (previously cancelled)

8. (previously cancelled)

9. (previously presented) The method according to Claim 1, wherein the signaling communications network is an ATM communications network.

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10. (original) The method according to Claim 9, wherein each connection is associated with a traffic rate, and connections associated with a common level of priority are listed in the release list in a sequence corresponding to the traffic rates of the connections.
11. (currently amended) The method according to Claim 10, wherein connections in the release list associated with a common level of priority are ordered in sequence from the connection having the ~~lowest~~ highest traffic rate to the connection having the ~~highest~~ lowest traffic rate.
12. (currently amended) A method for the ordered release of a subset of connections of a number of connections provided on a single logical trunk linking a first network entity and a second network entity, the logical trunk having a variable capacity, the method comprising the steps of:
- (a) associating a priority indicator and a traffic rate with each of the connections, the priority indicator being selected from a priority hierarchy comprised of a plurality of priority levels which varies from highest priority to lowest priority;
 - (b) upon detection of a reduction of the capacity of the logical trunk to a level sufficient to sustain only a reduced number of said connections, selecting from said number of connections a group of connections to be released having an aggregate capacity at least equal to said reduction in capacity of the logical trunk; and
 - (c) following said selection of connections to be released, releasing every connection of said group of connections in a sequence which corresponds to the priority hierarchy from the highest priority level to the lowest priority level while maintaining the remaining connections in said number of connections not included in said selected group of connections.
13. (previously presented) The method according to Claim 12, wherein the selecting of a group of connections comprises the further steps of:
- selecting connections for release from said number of connections in a sequence beginning with the connection associated with the lowest priority level, until the aggregate of the capacity of selected connections is greater than or equal to said reduction in capacity of the logical trunk; and

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compiling an ordered release list enumerating each connection selected for release.

14. (original) The method according to Claim 13, wherein the step of compiling the ordered release list comprises the step of inserting each connection selected for release into a table in a location corresponding to the priority level associated with the connection such that the connections in the table are ordered in a sequence from the connection associated with the highest priority level to the connection associated with the lowest priority level.
15. (original) The method according to Claim 14, wherein the connection path for each connection is established by a connection establishment request message corresponding to the connection, the connection establishment request message including priority level information, traffic rate information, and information identifying a source and a destination for the corresponding connection:
16. (original) The method according to Claim 15, wherein the step of releasing the connections in said release list comprises the step of transmitting a release message to the source of a connection in said release list.
17. (original) The method according to Claim 16, wherein the logical trunk comprises a plurality of physical links.
18. (original) The method according to Claim 18, wherein the logical trunk is an IMA trunk.
19. (original) The method according to Claim 18, wherein the logical trunk is an IMA trunk.
20. (original) The method according to Claim 19, wherein the priority indicators and traffic rates are associated with their respective connections in a look-up table in a memory in the first network entity.
21. (original) The method according to Claim 14, wherein connections associated with a common level of priority are list in the release list in a sequence corresponding to the traffic rates of the connections.

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22. (original) The method according to Claim 14, wherein connections in the release list associated with a common level of priority are ordered in sequence from the connection having the lowest traffic rate to the connection having the highest traffic rate.

23. (previously presented) An apparatus for the ordered release of switched connections in a signaling communications network, the switched connections being routed across a network entity in the communications network along respective connection paths therefor between source and destination entities in response to an establishment request message propagated over a signaling link, the connection paths each traversing the network entity via network entity interfaces provided with the network entity and through which said connections are routed, the apparatus comprising:

(a) means for storing a priority indicator associated with each of the switched connections, the priority indicator being selected from a priority hierarchy which varies from highest priority to lowest priority;

(b) means for sending connection release messages for every connection of a number of switched connections toward said source or destination entity upon failure of a signaling link or a port associated with said number of switched connections, said connection release messages being propagated toward said source entity if said failure is on the destination side of said network entity and toward said destination entity if said failure is on the source side of said network entity, and said connection release messages being sent in a sequence corresponding to the priority hierarchy from the connection associated in the storing means with the highest priority level to the connection associated in the storing means with the lowest priority level.

24. (original) The apparatus according to Claim 23, wherein the storing means is a memory.

25. (original) The apparatus according to Claim 24, wherein the memory comprises a look-up table and each connection is stored with a priority indicator in the look-up table.

26. (original) The apparatus according to Claim 25, wherein the directing means comprises means for compiling an ordered release list in the memory upon indication of the network outage to the apparatus, the compiling means enumerating in the ordered

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release list every connection of said number of connections in order from the connection associated with the highest priority level to the connection associated with the lowest priority level.

27. (original) The apparatus according to Claim 26, wherein each connection is established by a corresponding connection establishment request message received by the network entity, the connection establishment request message including a priority indicator, an identification of a source of the corresponding connection, and an identification of a destination of the corresponding connection, wherein the priority indicator for each connection is obtained by the apparatus from the corresponding connection establishment request message through the connecting means.

28. (original) The apparatus according to Claim 27, wherein the directing means comprises a means for transmitting release messages over said signaling links, and wherein the transmitting means releases each connection by:

transmitting a release message to the source of a connection in said release list if the network outage is detected between the network entity and the destination of the connection and transmitting a release message to the destination of a connection in said release list if the network outage is detected between the network entity and the source of the connection.

29. (original) The apparatus according to Claim 28, wherein the network outage is a failure of a signaling link corresponding to said number of connections, said signaling link being for communicating administrative information concerning operation of said number of connections.

30. (canceled)

31. (previously presented) The apparatus according to Claim 29, wherein the signaling communications network is an ATM communications network.

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32. (previously presented) The apparatus according to Claim 26, wherein each connection is associated in said look-up table with a traffic rate, and the compiling means lists connections associated with a common level of priority in the release list in a sequence corresponding to the traffic rates of the connections.

33. (currently amended) The apparatus according to Claim 32, wherein the compiling means enumerates connections associated with a common level of priority in the release list in sequence from the connection having the ~~lowest~~ highest traffic rate to the connection having the ~~highest~~ lowest traffic rate.

34. (previously presented) An apparatus for the ordered release of connections carried on a logical trunk having a variable capacity, the logical trunk being provided in a connection-oriented communications network between a first network entity and a second network entity and carrying a number of connections, the apparatus comprising

(a) means for storing a priority indicator and a traffic rate associated with each of the connections of said number of connections, the priority indicator being selected from a priority hierarchy which varies from highest priority to lowest priority;

(b) means for selecting from said number of connections, upon a reduction of the capacity of the logical trunk to a level sufficient to sustain only a reduced number of said connections, a group of connections to be released having an aggregate capacity at least equal to said reduction in capacity of the logical trunk; and

(c) means for directing the release of every connection of said group of connections in a sequence which corresponds to the priority hierarchy from the connection of the group associated with the highest priority level to the connection of the group associated with the lowest priority level while maintaining the remaining connections in said number of connections not included in said selected group of connections.

35. (original) The apparatus according to Claim 34, wherein the storing means is a memory.

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36. (original) The apparatus according to Claim 35, wherein the memory comprises a look-up table and each connection is stored with a priority indicator and with a traffic rate in the look-up table.

37. (previously presented) The apparatus according to Claim 36, wherein the selecting means selects connections for release from said number of connections in a sequence beginning with the connection associated with the lowest priority level, until the aggregate capacity of the selected connections is greater than or equal to the reduction in capacity of said logical trunk.

38. (original) The apparatus according to Claim 37, wherein the selecting means comprises a means for compiling an ordered release list in the memory enumerating each connection of said group of connections in a sequence which corresponds to the priority hierarchy from the connection of the group associated with the highest priority level to the connection of the group associated with the lowest priority level.

39. (original) The apparatus according to Claim 38, wherein each connection is established by a connection establishment request message, the connection establishment request message including a priority indicator, traffic rate information, an identification of a source of a corresponding connection, and an identification of a destination of the corresponding connection, wherein the priority indicator and traffic rate for each connection is obtained by the apparatus from the corresponding connection establishment request message through the connecting means.

40. (original) The apparatus according to Claim 39, wherein the directing means comprises a means for transmitting release messages, and wherein the transmitting means releases each connection in said release list by transmitting a release message to the source of a connection in said release list.

41. (original) The apparatus according to Claim 40, wherein the logical trunk comprises a plurality of physical links.

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42. (original) The apparatus according to Claim 41, wherein the connection-oriented communications network is an ATM communications network.

43. (original) The apparatus according to Claim 42, wherein the logical trunk is an IMA trunk.

44. (original) The apparatus according to Claim 43, wherein the compiling means enumerates connections associated with a common level of priority in the release list in a sequence corresponding to the traffic rates of the connections.

45. (original) The apparatus according to Claim 44, wherein the controller enumerates connections associated with a common level of priority in the release list in a sequence from the connection having the lowest traffic rate to the connection having the highest traffic rate.

46. (original) The apparatus according to Claim 41, wherein the apparatus is provided within the first network entity.